

What is claimed is:

1. A turbo speed controller for a turbocharger having a turbine housing and a plurality of blades, the speed controller comprising:

5 a speed sensor producing a turbocharger speed signal indicative of turbocharger rotational speed;

a rising rate limiter having an input receiving the turbocharger speed signal and an output producing a rate limited turbocharger speed signal;

10 a high envelope filter having an input receiving the rate limited turbocharger speed signal and an output producing a filtered and rate limited turbocharger speed signal;

15 a turbocharger speed control signal generator having an input receiving the filtered and rate limited turbocharger speed signal and an output producing a turbocharger speed control signal based on comparison of the filtered and rate limited turbocharger speed signal with a desired turbocharger speed; and

a swallowing capacity control mechanism responsive to the turbocharger speed control signal to vary a swallowing capacity of the turbocharger.

20 2. The speed controller of claim 1 wherein the speed sensor is an eddy current sensor sensing passage thereby of the blades of the turbocharger.

3. The speed controller of claim 1 wherein the turbocharger has an upper acceleration limit expressible as a dividend of a turbocharger speed threshold and a sampling rate;

25 and wherein the rising rate limiter is configured to sample the turbocharger speed signal at the sampling rate and bound an upper value of the rate limited turbocharger speed signal at a value less than a sum of the previous turbocharger speed signal and the turbo speed threshold.